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Two New Species of the Genus *Holaspulus* (Acarina: Gamasida: Parholaspidae) from the Ryukyu Islands, Japan

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ABSTRACT—Two new mite species of the genus *Holaspulus* belonging to the gamasid family Parholaspidae are described from litter or soil layer of the Ryukyu Islands: *H. reticulatus* and *H. ishigakiensis*.

The genus *Holaspulus* was proposed by Berlese in 1904 for *Holostaspis* (*Holaspulus*) *tenuipes* from Italy [1], and was later dealt with by Evans [2], Krantz [5] and Ishikawa [3, 4].

The Ryukyu Archiperago consists of a chain of many islands and harbours various animals of zoogeographic interest. From the acarological viewpoint, it is worth noting that a plesiomorphic species with claws on the tarsus I was found by this study. In the present paper, the author is going to describe two new species, *Holaspulus reticulatus* sp. nov. and *H. ishigakiensis* sp. nov. The holotype, allotype and a part of paratypes of the new species are deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo. The remaining paratypes are retained in the collection of the Laboratory of Biology, Matsuyama Shinonome College, Matsuyama.

MATERIALS AND METHODS

Litter or soil samples were brought back to the author's laboratory in the cotton bags, and the mites were extracted from the samples by using modified Tullgren apparatus. The specimens were preserved in 70% ethanol, cleared in lactophenol, and mounted in Hoyer's medium. The holotype or allotype were used in measuring the length of dorsal setae, gnathosoma and legs.

DESCRIPTION

Holaspulus reticulatus sp. nov.
[Japanese name: Iriomote-heragehokodani]
(Fig. 1 A-G)

Female. Length of idiosoma ca. 590 μm; width of idiosoma ca. 390 μm; length of dorsal shield with a range of 553-592 μm, av.569 μm; width of dorsal shield at the level of coxae IV with a range of 290-332 μm, av. 313 μm; light brown in colour.

Dorsum. Dorsal shield sclerotized and ornamented with punctations and reticulations, especially in the posterior portion. Dorsal shield bearing thirty pairs of setae, which are spatulate distally except for simple and minute setae *z1*, and with twenty-two pairs of pores. Extra-marginal setae spatulate distally and lying on striated lateral interscutal membrane. Length of setae (the length of dorsal shield of holotype 560 μm): verticals *z1* 41 μm, *j2* 38 μm, *j3* 34 μm, *j4* 33 μm, *j5* 30 μm, *j6* 33 μm, *J1* 35 μm, *J2* 26 μm, *J6* 43 μm, *z1* 3 μm, *z2* 40 μm and humerals *r2* 50 μm. The distribution of setae and pores are as shown in Figure 1A.

Venter. Tritosternum well developed, a pair of pilose laciniae more than twice longer than tritosternal base. Presternal shields composed of a pair of narrow platelets. Sternal shield ornamented with a network of ridges and punctations, and fused with endopodal shields. Sternal setae I longer than setae II and III, setae III lying well inside the bases of setae II. Metasternal shields narrow, located behind the posterior angles of sternal shield, and with a pair of simple setae and pores. Epigynial shield coalesced posteriorly with ventri-anal shield, and with a pair of genital setae. Ventri-anal shield fused with epigynial, podal-peritrematal shields, and with four pairs of preanal setae in addition to three perianal ones. Expulsory vesicles of ventri-anal shield absent. Interscutal membrane between dorsal and ventral shields bearing fourteen pairs of setae, seven of which are conspicuously spatulate. Metapodal shields present. Stigmata situated at a position antero-lateral to coxae IV. Peritremes extending to coxae I.

Gnathosoma. Epistome consisting of elongated median and lateral extensions, and with denticulated anterior margin. Palpal apotele bearing three tines, two of which are spatulate distally. Fixed digit of chelicera tridentate and with a pilus dentilis; the movable digit (150 μm) is bidentate and longer than corniculus (116 μm). Length of anterior hypostomatic seta 53 μm, external posterior hypostomatic seta 25 μm, internal posterior hypostomatic seta 25 μm and deutosternal seta 22 μm.

Legs. Tarsus I with neither claws nor pulvilli; tarsus I (168 μm) much longer than tibia I (77 μm). Tarsi II to IV each with well developed claws and pulvilli. Length of legs: I (excl. sensory setae) 578 μm, II 460 μm, III 385 μm and IV 501 μm.

Male. Length of idiosoma ca. 513 μm; width of idiosoma ca. 325 μm; length of dorsal shield with a range of 480-518 μm, av. 503 μm; width of dorsal shield at the level of

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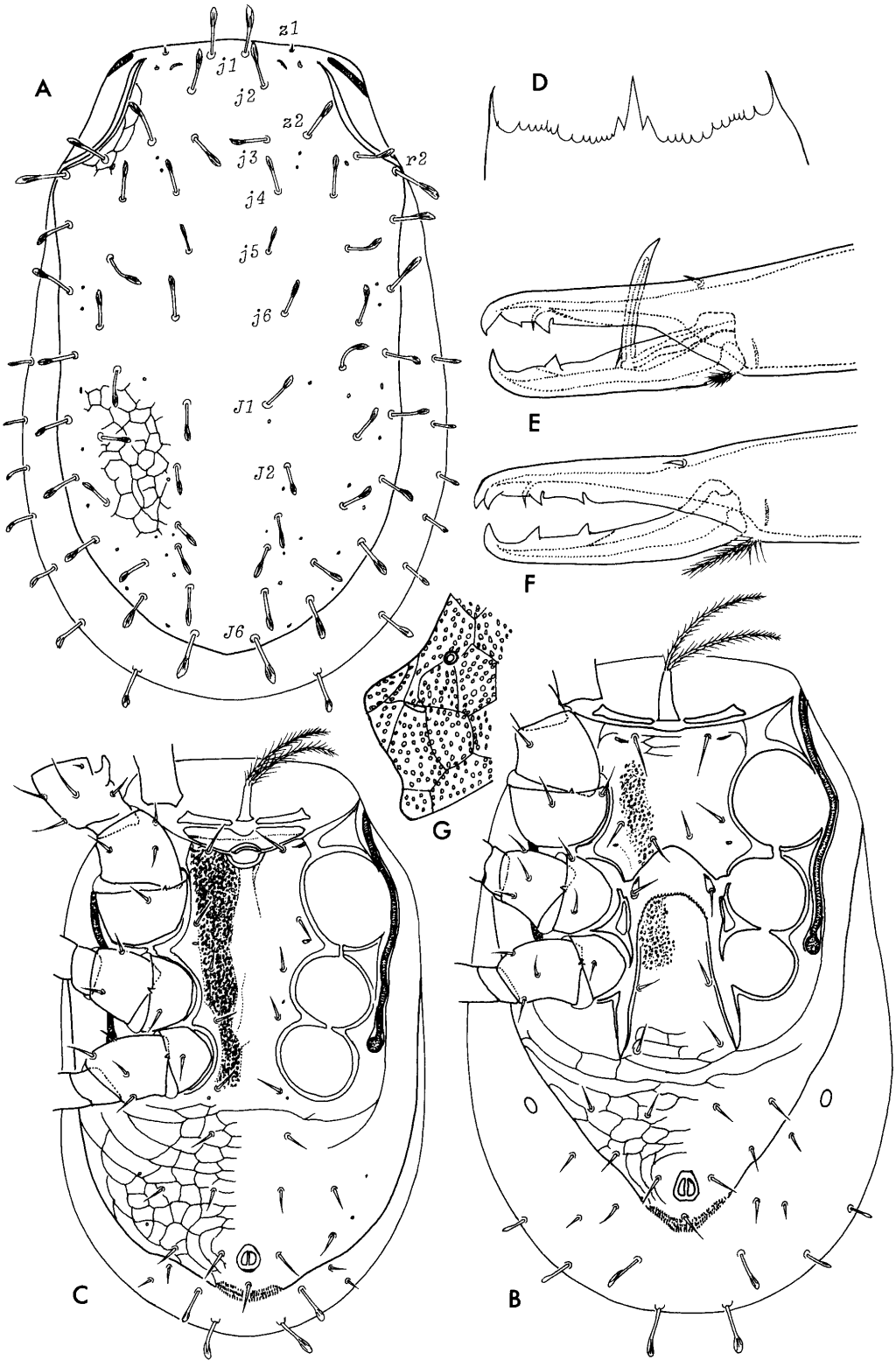

FIG. 1. *Holaspulus reticulatus* sp. nov. (A-B, D, F-G, female; C, E, male). A, Dorsum; B-C, venter; D, epistome; E-F, chelicera; G, ornamentation of sternal shield.

coxae IV with a range of 290–328 μm, av. 311 μm.

Dorsal chaetotaxy and ornamentation similar to those of female. Sterniti-genital portion ornamented with network and punctations, and with five pairs of simple setae. Ventri-anal portion reticulated and with four pairs of simple setae and three perianal setae. Fixed digit of chelicera bidentate; movable digit (127 μm) unidentate and approximately twice the length of spermatodactyl (63 μm). Tarsus I without claws and pulvilli. Femur II with a large thumb-like spur, and genu, tibia and tarsus II each with a small spur. Length

of legs: I (excl. sensory setae) 562 μm, II 450 μm, III 378 μm and IV 493 μm.

Type series. Holotype ♀ (NSMT-Ac 10429) and allotype ♂ (NSMT-Ac 10430), Kanbira-no-taki, Iriomote Is., Ryukyus, 3-X-1978, K. Ishikawa. Paratypes: 6♀♀, 8♂♂, same data as the holotype; 5♀♀, 3♂♂, Ohtomi, Iriomote Is., Ryukyus, 4-X-1978, K. Ishikawa.

Remarks. No close relatives of this new species have been known up to now. However, this species may be remotely related to *Holaspulus ishigakiensis* sp. nov., from

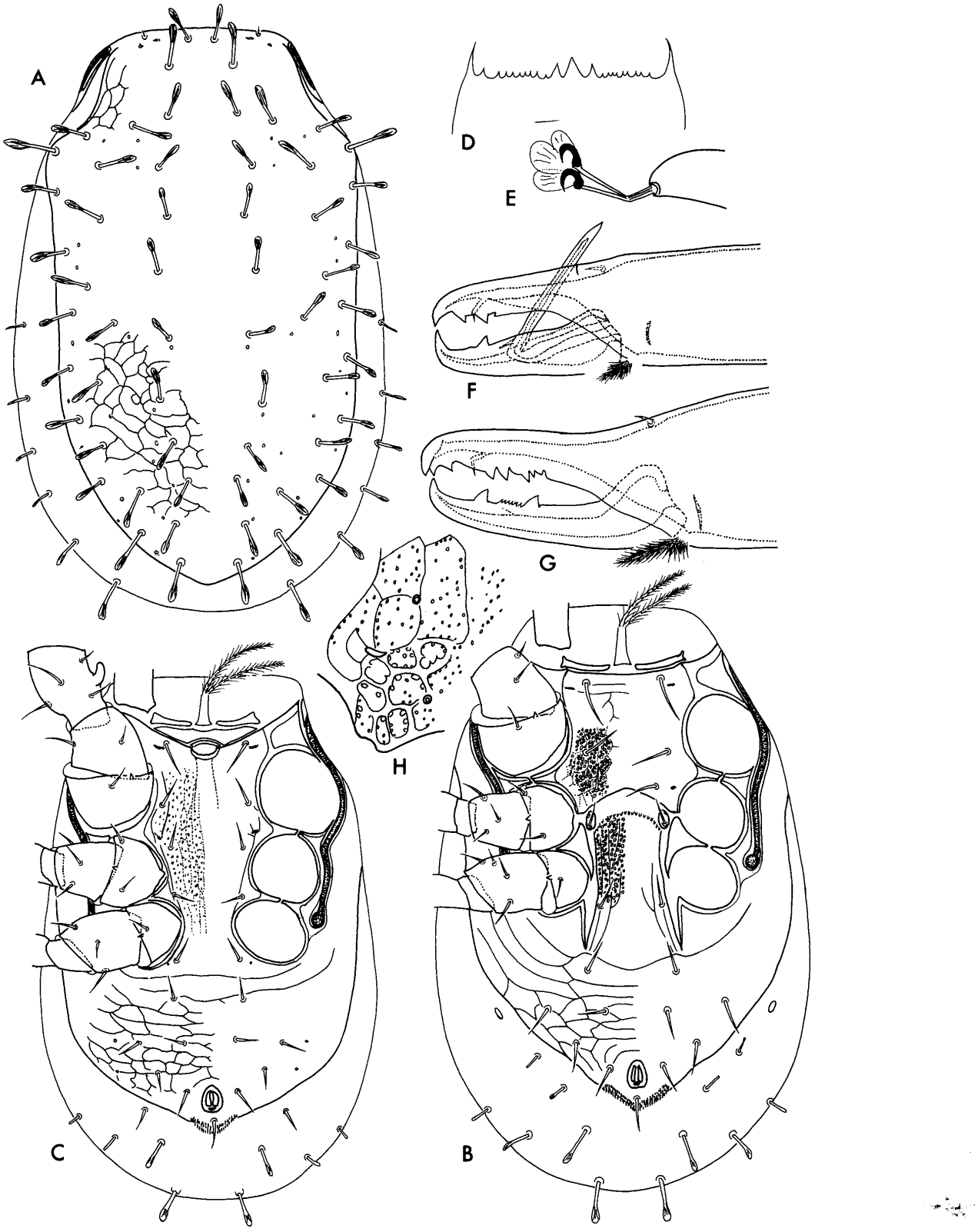

FIG. 2. *Holaspulus ishigakiensis* sp. nov. (A-B, D, G-H, female; C, E-F, male). A, Dorsum, B-C, venter, D, epistome; E, claws of tarsus I; F-G, chelicera; H. ornamentation of sternal shield.

Ishigaki Is., because of the following characteristic features: movable digit of chelicera of female with two large teeth, instead of bearing two large and several small teeth; tarsus I of male without claws and pulvilli, instead of the presence of claws and pulvilli.

Holaspulus ishigakiensis sp. nov.
[Japanese name: Ishigaki-heragehokodani]
(Fig. 2 A-H)

Female. Length of idiosoma ca. 570 μm; width of idiosoma ca. 380 μm; length of dorsal shield with a range of 523–565 μm, av. 546 μm; width of dorsal shield at the level of coxae IV with a range of 290–347 μm, av. 312 μm.

Dorsum. Dorsal shield sclerotized and ornamented with punctations and reticulations, particularly in the posterior portion. Dorsal shield provided with thirty pairs of setae and twenty-two pairs of pores; its setae spatulate distally with the exception of simple minute setae *z1*. Extramarginal setae spatulate distally and increasing in length from anterior to posterior. Length of setae (the length of dorsal shield of holotype 550 μm): verticals 40 μm, *j2* 38 μm, *j3* 37 μm, *j4* 34 μm, *j5* 32 μm, *j6* 36 μm, *J1* 29 μm, *J2* 33 μm, *J6* 41 μm, *z1* 2 μm, *z2* 41 μm and humerals 55 μm. The distribution of setae and pores are as shown in Figure 2A.

Venter. Tritosternum well developed, a pair of pilose laciniae more than twice as long as tritosternal base. Presternal shields consisting of a pair of narrow platelets. Sternal shield ornamented with network and closely set punctations; three pairs of simple setae present, setae III lying well inside the bases of setae II. Metasternal shields free, and with a pair of simple setae and pores. Epigynial shield fused posteriorly with ventri-anal shield, and with a pair of simple setae. Ventri-anal shield fused with epigynial, podal-peritrematal shields, and with four pairs of preanal setae and three perianal setae. Expulsory vesicle of ventri-anal shield absent. Interscutal membrane between dorsal and ventral shields bearing twelve pairs of setae, six pairs of which are conspicuously spatulate. Metapodal shields present. Stigmata located at a position antero-lateral to coxae IV. Peritremes extending to coxae I.

Gnathosoma. Epistome with spinose median projection, and with several short spines on either side and a pair of elongate lateral extensions. Palpal apotele provided with three tines, two of which are spatulate distally. Fixed digit of chelicera with six teeth and a pilus dentilis; the movable digit (123 μm) is bidentate in addition to several small teeth, and longer than corniculus (108 μm). Salivary stylus (95 μm) well developed. Length of anterior hypostomatic seta 67 μm, external posterior hypostomatic seta 32 μm, internal posterior hypostomatic seta 36 μm and deutosternal seta 30 μm.

Legs. Tarsus I (192 μm) much longer than tibia I (87 μm), without claws and pulvilli. Tarsi II to IV each with well developed claws and pulvilli. Length of legs: I (excl. sensory setae) 578 μm, II 440 μm, III 380 μm and IV 478 μm.

Male. Length of idiosoma ca. 500 μm; width of idiosoma ca. 320 μm; length of dorsal shield with a range of 475–527 μm, av. 493 μm; width of dorsal shield at the level of coxae IV with a range of 280–305 μm, av. 292 μm.

The chaetotaxy and ornamentation of dorsal shield are essentially the same as in the female. Sterniti-genital portion ornamented with network and punctations. Ventri-anal portion reticulated and provided with four pairs of simple setae and three perianal ones. Fixed digit of chelicera bidentate; movable digit (95 μm) unidentate and longer than spermatodactyl (74 μm). Each tarsus provided with claws and pulvilli. Femur II with a large thumb-like spur, and genu, tibia and tarsus II each with a small spur. Length of legs: I (excl. sensory setae) 561 μm, II 458 μm, III 370 μm and IV 443 μm.

Type series. Holotype ♀ (NSMT-Ac 10431) and allotype ♂ (NSMT-Ac 10432), Kabira, Ishigaki Is., Ryukyus, 10-VII-1987, K. Ishikawa. Paratypes: 7♀♀, 4♂♂, same data as the holotype; 2♀♀, 3♂♂, Yoon, Ishigaki Is., 6-XII-1972, J. Aoki; 5♀♀, 3♂♂, Mt. Yonahadake, Okinawa Is., 6-X-1978, K. Ishikawa; 6♀♀, 5♂♂, Yonehara, Ishigaki Is., 2-X-1978, K. Ishiakawa.

Remarks. The present species differs from the previously known members of the genus *Holapulus* in the movable digit of the female chelicera provided with two large and several small teeth, instead of only two large teeth. On the other hand, this species seems closely related to *H. reticulatus* sp. nov., from Iriomote Is., but is distinguished from that species by the following points: tarsus I of male provided with claws and pulvilli, instead of lacking them; the length of spermatodactyl is 0.8 times that of movable digit, instead of 0.5.

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